

**CLAIMS**

1. An isolated CGI-69 nucleic acid comprising:
  - (a) a nucleic acid sequence comprising at least 80% identity with SEQ ID NO:1, excluding the CGI-69 nucleic acid having the sequence of SEQ ID NO:2; or
  - (b) a complement of the nucleic acid sequence of (a).
2. The isolated CGI-69 nucleic acid of claim 1 comprising:
  - (a) a nucleic acid sequence comprising at least 80% identity with a fragment of SEQ ID NO:1 consisting of nucleotide 14 to nucleotide 1093, excluding the CGI-69 nucleic acid having the sequence of SEQ ID NO:2 consisting of nucleotide 118 to nucleotide 1173; or
  - (b) a complement of the nucleic acid sequence of (a).
3. The isolated CGI-69 nucleic acid of claim 1, wherein the nucleic acid sequence encodes a polypeptide comprising at least 80% identity with the polypeptide of SEQ ID NO:3, excluding the polypeptide of SEQ ID NO:4, wherein the polypeptide comprises at least one biological activity of the polypeptide of SEQ ID NO:3.
4. The isolated CGI-69 nucleic acid of claim 3, wherein biological activity comprises mitochondrial localization.
5. A vector comprising the isolated CGI-69 nucleic acid of claim 1.
6. The vector of claim 5, wherein the vector is an expression vector comprising the CGI-69 nucleic acid of claim 1 operably linked to a promoter.
7. The vector of claim 6, wherein the promoter is recognized by a mammalian cell transformed with the vector.
8. A host cell comprising the vector of claim 5.

9. The host cell of claim 8, wherein the cell is a 293 cell.
10. An isolated CGI-69 polypeptide comprising an amino acid sequence having at least 80% sequence identity to the sequence of SEQ ID NO:3, excluding the CGI-69 polypeptide having the sequence of SEQ ID NO:4.
11. The isolated CGI-69 polypeptide of claim 10, wherein said polypeptide is a biologically active CGI-69 polypeptide.
12. The isolated CGI-69 polypeptide of claim 10, wherein said amino acid sequence has at least 90% sequence identity to the sequence of SEQ ID NOS:3.
13. A CGI-69 fusion protein comprising a polypeptide fused to the carboxy-terminus of a polypeptide comprising an amino acid sequence having at least 80% sequence identity to the sequence of SEQ ID NO:3.
14. The CGI-69 fusion polypeptide of claim 13, wherein the fusion protein acts as an uncoupling protein.
15. The CGI-69 fusion polypeptide of claim 14, wherein the polypeptide fused to the carboxy-terminus is negatively charged.
16. The CGI-69 fusion polypeptide of claim 14, wherein the polypeptide fused to the carboxy-terminus comprises the sequence of SEQ ID NO:17.
17. An antibody that specifically binds to the polypeptide of claim 10.
18. A method of treating a metabolic disorder comprising modulating the activity of CGI-69.
19. The method of claim 18, wherein said modulating activity of CGI-69 comprises decreasing the activity of CGI-69.

20. The method of claim 19, wherein said decreasing activity comprises decreasing the expression of *CGI-69*.
21. The method of claim 20, wherein said metabolic disorder is selected from the group consisting of cachexia, tumors, cancers, viral infections and bacterial infections.
22. The method of claim 18, wherein said modulating activity of *CGI-69* comprises increasing the activity of *CGI-69*.
23. The method of claim 22, wherein said increasing activity comprises increasing the expression of *CGI-69*.
24. The method of claim 22, wherein said metabolic disorder is selected from the group consisting of obesity, tumors, cancers, viral infections and bacterial infections.
25. A method for determining whether a compound up-regulates or down-regulates expression of a *CGI-69* gene in a cell, comprising:
  - (a) contacting the cell with said compound; and
  - (b) detecting expression of the gene.
26. The method of claim 25, wherein mRNA encoding *CGI-69* is detected.
27. The method of claim 25, wherin a *CGI-69* polypeptide is detected.
28. The method of claim 25, wherin said composition is a cell.
29. A transgenic non-human animal, having a disrupted *CGI-69* gene.
30. The transgenic non-human animal of claim 29, wherein the non-human animal is a mouse.

31. A transgenic non-human animal, comprising a transgene having at least 80% sequence identity to the sequence of SEQ ID NO:1 or a complement of said sequence.
32. A method of screening for a mutation in CGI-69 comprising comparing a nucleic acid sequence to the sequence of SEQ ID Nos:1 or 2.
33. A method of measuring CGI-69 agonist or antagonist activity of a compound comprising:
  - (a) contacting a composition comprising CGI-69 activity with the compound; and
  - (b) determining a change in the CGI-69 activity.
34. The method of claim 33, wherein the composition is a cell.